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AMMUNITION BULLETIN N° 28

FOR INSPECTING ORDNANCE OFFICERS

AND

A.A. AMMUNITION OFFICERS

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CHIEF INSPECTOR OF ARMAMENTS,
WOOLWICH, S. E. 18.

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Security.

AMMUNITION BULLETIN NO. 28
FOR
INSPECTING ORDNANCE OFFICERS
AND
A.A. AMMUNITION OFFICERS.

ISSUED BY:-

June, 1942.

CHIEF INSPECTOR OF ARMAMENTS,
WOOLWICH.

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493 ROCKET, U. 3-INCH. INSPECTION AND SENTENCING OF BAGS CONTAINING SILICA GEL
IN TAILS PROPPELLING

Reference Item 266, Bulletin No. 19 and Item 422, Bulletin No. 25.

1. The absorptive capacity of silica gel is approximately 45% but, to provide a safety margin, 35% is to be regarded as the limit. At assembly in R.O.F.s., filled bags are accepted for insertion if the moisture content does not exceed 6%. In order that the moisture content can be estimated at Service inspections by weighing, a system has now been introduced in the R.O.F.s. whereby check weighing is carried out to ensure that the bags inserted contain 50 ± 1 grams of silica gel. The weight of the empty bag is 3 grams. These bags (i.e. those which have been accepted after check weighing) are marked "50 GR". Bags inserted before the introduction of this system are not weight marked. These were filled by a scoop measure and the weight may vary considerably.
2. Unmarked bags of silica gel (i.e. those which were not check weighed) will be removed from 3-inch tails, on a time basis, after 12 months from the date of filling, as stencilled on the tail, and bags marked "50 GR" will be inserted. If the general condition of the tail indicate deterioration resulting from moisture the tail will be set aside for examination of the igniter at a R.O.F.
3. Unmarked bags in tails with defective closing discs, set aside and reported to I.O.O.'s in accordance with Item 422, Bulletin No. 25 will be removed and bags marked "50 GR" will be inserted. Tails showing signs of deterioration resulting from moisture will be dealt with as in para. 2.
4. Bags marked "50 GR" in 3-inch tails will be weighed, on a time basis, at intervals of 12 months and sentenced in accordance with para. 6.
5. Bags marked "50 GR" in 3-inch tails with defective closing discs, set aside and reported to I.O.O.'s in accordance with Item 422, Bulletin No. 25 will be weighed and sentenced in accordance with para. 6.
6. If the increase in the weight of the silica gel is under 10% the same bag will be replaced. If the increase is between 10% and 35% the bag of silica gel will be discarded and a new one inserted in its place. Where the increase in weight exceeds 35% the tail will be set aside for return to R.O.F. for examination of the igniter. Taking the weight of the empty bag into consideration the weights and corresponding sentences are as follows:-

Weight of Filled Bags.	Sentence
Less than 59 grams	Serviceable with same bag.
59 grams to 72 grams	Serviceable with new bag.
Greater than 72 grams	Set aside for examination of igniter.

7. Discarded bags of silica gel will be placed in a container and returned in bulk for subsequent reconditioning at a R.O.F.
8. The detailed procedure for the removal and replacement of silica gel bag is given in Item 494. The instrument for the testing of the circuit, referred to in the procedure, is not yet available. In the meantime this test will be omitted, no unauthorized instrument or device will be used for this purpose.

94 ROCKET, U, 3-INCH. REPLACEMENT OF SILICA GEL BAGS IN TAILS PROPPELLING.

GENERAL.

1. Air-tight packages containing 20 spare bags of silica gel are issued for the use of I.O.Os. who, to avoid deterioration of gel in unsealed packages, will arrange to deal with the tails in groups of 20.
2. The operation of replacing bags of unserviceable silica gel will be performed in a dry atmosphere on the 'Z' site. In order to ensure that grit is not allowed to enter the tail the repair should be carried out in a hut when one is available. Huts in use for other purposes will not be used.
3. The tail units must be thoroughly dry and clean and, to avoid the deposition of moisture on them, should not be colder than the atmosphere where the repair is carried out. The same precautions will be taken for the spare glazedboard cups and closing discs.
4. The air-tight package containing the spare silica gel must only be opened when necessary and tightly closed again as soon as possible. In order to limit the time of exposure the number of tails under repair at the same time should be limited to 5.

PROCEDURE.

1. The following stores are required :-

Cups glazedboard
Closing disc, bakelite or paper (Bakelite discs will be used when available). Fig. 188
Cement R.D. No.1 (with xylene or naphtha solvent if required for thinning).
Brush cement.
Scraper of non ferrous metal for the removal of R.D. cement (e.g. scrapers, shell, interior).
Clean dry rags.
Bags of silica gel in air-tight package
 $\frac{3}{8}$ spanner (for contact nut)
 $\frac{5}{16}$ spanner (for contact screw)
Circuit testing instrument
Spare contact nuts
Spare insulating washers for contact screws
Spare insulating bushes for contact nuts and screws (or spare insulating cups and bushes, as available)
Tool inserting glazedboard cup (To be made locally)
Tool inserting bakelite closing disc (To be made locally if bakelite closing discs are supplied)
Pliers for the removal of bakelite closing discs.

2. The tails will first be tested for continuity of circuit, only the authorised testing instrument will be used for this purpose. Tails in which a short or break in the circuit is indicated will be returned for repair. This repair is a R.O.F. operation. The test will be carried out in a projector, the firing circuit of which will first be disconnected and the projector laid in a safe direction. Tails will not be tested with projectiles assembled. (This test will be omitted until authorized instruments are available).

3. Tails which pass the test will then be fitted with new bags of silica gel where necessary, by the following procedure :-

- (a) With the tail in a horizontal position remove the closing disc. If the closing disc is of the bakelite type it may be found necessary to break the disc by crushing a portion of the curved protrusion by means of a pair of pliers. This should be done carefully to avoid breaking the soldered junction of the leads.

After removing the disc, examine the extension leads connected across the tube to ascertain if these are of the longer (4-inch) type, which has been introduced so that the leads can be folded back close to the venturi walls and the silica gel bag withdrawn without the necessity for undoing the contact screws. If the leads are not of the longer type, proceed as in (b)

- (b) Remove the nut from each of the terminal contact screws, i.e., the two which are connected by short extensions of the leads from the contacts to which the fuze leads are directly connected. During this process the internal head on the contact screw will be held stationary by means of a spanner and care must be taken to avoid damage to the insulating cup or moulded bush under the nut. The screw is then removed by applying pressure to its stem from the outside of the tube. The screws must not be removed by pulling the soldered leads and care must be taken to avoid damage to the insulating washer under the head of the screw. If the insulator under the contact nut is of the moulded type it is in the form of a cup and bush combined but if it is of the earlier type (a cup only) an insulating sleeve will be found in the screw hole. This must be removed and set aside to avoid loss. The two leads with their screws will be tied back, clear of the venturi, by means of string. The insulating devices are shown in the Fig. 187
- (c) Remove the glazedboard cup and all trace of the R.D. cement which secured the disc and cup. This will be done by careful scraping and afterwards cleaning with a dry rag to provide a clear seating for the new cup and disc. The scraper used should be of non ferrous metal.
- (d) Prepare the glazedboard cups for insertion by applying R.D. cement around the exterior of the flange by means of a brush.
- (e) Remove the unserviceable bags and place them in a container for return to store. In the case of bags marked "50 GR" proceed as laid down in Item 493.
- (f) Insert the new bags, choke leading, and insert the prepared cups with the base leading and the leads of the fuze passing through the slot. Ensure that the flange of the cup is firmly pressed against the wall of the venturi tube. The period during which the air-tight package is opened to obtain the bags will be as short as possible. For the purpose of inserting the cup an inserting tool should be made locally. This should consist of cylindrical hardwood plug with a diameter of 2.2 inches and should be sufficiently long to afford a hand grip and enter the tail to a distance of 3.5 inches. A groove to accommodate the fuze leads should be formed along the plug.
- (g) Replace the two contact screws, each with an insulating washer under the head, in the appropriate holes, i.e. diametrically opposite the contact to which the extending lead is connected. The moulded insulator bush (or paper bush and insulator cup) will then be placed in position from the exterior of the tube and the contact nut replaced. The head of the screws will be held by means of a spanner while the nut is tightened and left square with the tube. Defective insulators will be discarded and fresh ones substituted.
- (h) Coat the rim of the closing discs with R.D. cement and place them in position. With bakelite closing discs the cross channels will be aligned with the contacts. The outside surface of the discs will then be coated with R.D. cement. For the purpose of inserting closing discs of the bakelite type it will be necessary to use an inserting tool. This should be made locally and should consist of a cylindrical hardwood plug 2.9 inches in diameter and sufficiently long to afford a handgrip. The forward end of the plug which will be used to press the closing disc into position should be recessed to a depth of .75 inches. The recess should

be central and of 1-inch radius. Two diametrical slots, at right angles, should also be formed at the forward end. These slots should be .75 inches in depth and width and are intended to fit over the protruding surfaces of the cross channels in the closing disc.

- (i) When the cement is dry to the touch the tails may be removed for a re-test of the circuit as given in para.2.
- (j) Tails found to be correct at the re-test will be stencilled to indicate they have been examined and the month and year of examination in the usual way. Those found defective will be returned for repair at a R.O.F.

495

MORTARS, 60 MM. M.1 & M.2. (AMERICAN) COMPLETE ROUND WITH SHELL, H.E. M.49A2

1. Components (Fig 189)

The complete round, (referred to on the Ammunition Data Card, in the package, by the drawing number 75-1-82) consists of the following components:-

Primer, Percussion, M.32	(Means of ignition)
Cartridge, ignition, M.5.	(Primary charge).
Increment, propellant, M.3.	(4 Secondary charges).
Shell H.E. M.49A2.	(S/L bomb).
Fuze, P.D. M.52.	(Direct action nose fuze).

2. Primer, percussion M.32 (Fig.192)

The aluminium alloy body of the primer is screw-threaded for insertion in the propellant container at the tail of the bomb and is fitted with a housing which carries a powder pellet and an initiator cap. A striker is carried in a recess in the primer body. The base of the primer is marked to indicate the filler and the date of filling.

3. Cartridge, ignition M.5 (Fig.191)

The cartridge consists of a rolled paper body which is closed by chip-board washers and discs of onion skin paper at each end and contains 47 grains of "Powder, propellant 60 mm Mortar (ignition cartridge)". One of the end discs is marked to indicate the filler, the date of filling and the mortar. The external dimensions of the cartridge are, length 1.33 inches, diameter .655 inches.

4. Increment, propellant M.3 (Fig.190)

The increment is made up of four units, each with an approximate weight of 35 grains, and consisting of a number of square flakes secured together by silk sewing which passes through a central perforation in the flakes. The flakes are one inch square and .0048 inches thick. The weight of the units is sometimes adjusted by cutting a notch in the assembled flakes.

5. Shell H.E. M.49A2 (Fig.189)

This is a streamlined bomb, grooved at the shoulder behind the rounded head and fitted with a perforated propellant container at the tail. The container carries eight vanes constructed in pairs. The vanes are slotted for the assembly of the increment propellant. The bursting charge consists of .34 lb. of T.N.T. and has a cavity to accommodate the lower portion of the fuze.

The shell is painted yellow and is stencilled in black "60M, TNT, SHELL M.49A2". The ammunition lot number and initials of the filler are also stencilled in black near the tail.

6. Fuze Point Detonating M.52

7. Dimensions of Ammunition.

The overall length of the complete round is 9.54 inches.

The weight of the complete round is 2.9 lbs.

The weight of the filled shell is 2.01 lb.

8. Packing.

Each complete round is packed in "Container, fibre, M.50". Six of these containers are packed in "Container fibre M.51" and three of these M.51 containers are secured in a bundle packing device. Thus the complete package contains eighteen rounds.

Container M.50 is cylindrical with turned plate end-pieces and is painted black. The junction of lid and body is sealed by a strip of adhesive tape which is yellow in colour to indicate the H.E. filling of the shell. The tape is stencilled to indicate the nomenclature of the round and the turned plate end piece in the lid is marked to indicate the nomenclature of the mortar, shell and container, also the filled lot number and the filler. The container is 10.5 inches long and 3 inches in diameter. The estimated filled weight is 2.96 lb.

Container M.51 is of similar construction to the M.50 but is 21.3 inches long and 7 inches in diameter. The estimated weights are:-

Container M.51 empty	3.7 lb.
6 containers M.50	3.3 lb.
6 complete rounds	17.8 lb.
Container M.51 filled	<u>24.8 lb.</u>

The bundle packing device consists of two steel end pieces, shaped to fit over the ends of the M.51 containers, and a central bolt which passes through the end pieces and is secured by a winged nut. The nut is provided with a seal. The following details are given on a plate at the end of the bundle package:- nomenclature of mortar and shell, number of rounds and the lot number.

9. Stowage Dimensions.

The stowage dimensions of the bundle packing (18 rounds) are, 23.1 x 14.2 x 13.3 inches. The weight is 81.3 lb. and the volume 2.51 cubic feet. With careful stowage, taking advantage of the shape of the package, the actual volume required may be reduced to approximately 70%.

496 AMERICAN 60-MM MORTAR AMMUNITION. COMPLETE ROUND WITH SHELL, PRACTICE M50A2 for MORTARS M.1 AND M.2.

1. Components.

The complete round, (referred to on the Ammunition Data Card, in the package, by the drawing number 75-1-83) consists of the following components:-

Primer, percussion, M.32	(See Item 495)
Cartridge, ignition, M.5	{ " 495 }
Increment, propellant, M.3	{ " 495 }
Shell, practice, M50A.2.	
Fuze, P.D. M.52	(See Item 500)

2. Shell, Practice, M.50A2

The shell, filled and fuze is the same weight as the H.E. M49A2. The filling is partly inert and includes a pellet of gunpowder. Further details are not yet available.

3. Packing and Dimensions for Stowage.

These particulars are same as those given in Item 495

497 MORTARS 81-MM. M.1 & 3-INCH MK. 1A2 (AMERICAN). COMPLETE
ROUND WITH SHELL H.E. M43A1

1. Components (Fig.193)

The complete round, (referred to on the Ammunition Data Card, in the package, by the drawing number 75-1-88) consists of the following components

Primer, percussion, M.33.
Cartridge, ignition, M.6.
Increment, propellant M.1 (6 charges).
Shell, H.E., M43A1
Fuze, P.D., M.52.

2. Primer, percussion M.33 and Cartridge, ignition M.6

Details of these components are not yet available.

3. Increment, propellant M.1.

The increment is made up of six units, each with an approximate weight of 116 grains, and consisting of a number of square flakes secured together by silk sewing which passes through perforations in the flakes. The flakes are 1.49 inches square and .010 inches thick.

4. Shell H.E. M43A1

This is a streamlined bomb, grooved at the shoulder behind the rounded head, and fitted with a perforated propellant container at the tail. The container is screwthreaded internally to receive the primer and carries six vanes attached in pairs. The vanes are slotted for the assembly of the increment charges. The bursting charge consists of approximately 1.23 lb. of T.N.T., amatol 50/50 or trimonite and has a cavity to receive the lower portion of the fuze. With the amatol filling the cavity has a T.N.T. surround and with the trimonite filling a bakelite fuze-well cup lines the cavity. An adapter to receive the fuze is fitted at the head of the shell.

The shell is painted yellow and is stencilled in black "81M & 3M TNT ("AM50-50" or "TRIMONITE") SHELL M43A1". The ammunition lot number and initials of the filler are also stencilled in black near the tail.

5. Fuze, P.D. M.52.

See Item 500

6. Dimensions of Ammunition.

The overall length of the complete round is 13.27 inches.

The weight of the complete round is 6.92 lb.

The weight of the filled shell is 5.48 lb.

7. Packing.

Each complete round is packed in "Container fibre M.36". Six M.36 containers are secured in a bundle packing device. Thus the complete package contains 6 rounds.

The M.36 container is similar to the M.50 (described in Item 495 para. 8) but is 14.5 inches long and has a diameter of 4 inches. The estimated weight of the filled container is 9 lb.

The bundle packing device is similar to that described in Item 495 para. 8 but includes a centre assembly plate to enable the containers to be assembled in pairs, arranged end to end, between the end plates of the device.

8. Stowage Dimensions.

The stowage dimensions of the bundle packing (6 rounds) are 30.6 x 8.1 x 7.6 inches. The weight is 58 lb. and the volume 1.08 cubic feet. The shape of the package enables the required stowage capacity to be reduced to approximately 70% with careful stowing.

498 MORTARS 81-MM. M.1 AND 3-INCH MK.IA2 (AMERICAN). COMPLETE ROUND WITH SHELL H.E. M.56.

1. Components (Fig.194)

The complete round, (referred to on the Ammunition Data Card, in the package, by the drawing number 75-1-97) consists of the following components:-

Primer, percussion, M.34.
Cartridge, ignition, M.6.
Increment, propellant, M.2 (4 charges).
Shell, H.E., M.56
Fuze, P.D., M.53.

2. Primer, percussion M.34 and Cartridge, ignition M.6.

Details of these components are not yet available.

3. Increment, propellant M.2. (Fig.196)

The increment is made up of four units, each with an approximate weight of 205 grains, and consisting of a number of square flakes secured together by silk sewing. A circular hole, 1.21 inches in diameter is formed in the centre of the flakes, with a slit at one side, for assembly in front of the vanes on the tail of the shell. The units assembled in this way are retained against the forward ends of the vanes by a wire split clip known as the "Holder propellant". The dimensions of the flake are 2.22 inches square and .0076 inches thick.

4. Shell, H.E., M.56.

This is a streamlined cylindrical thin walled bomb with an ogival head and vaned tail unit. A band is formed towards each end of the cylindrical part of the body. The front band has three projections formed on it which provide three point support in the mortar. The rear band has a number of grooves formed in it. An adapter, to take the fuze, is fitted at the head and a perforated propellant container carrying twelve vanes is assembled at the tail. The container is screwthreaded internally to receive the primer and consists of a steel liner inside an aluminium alloy tube which carries the vanes. The bursting charge consists of approximately 4.3 lb. of T.N.T., amatol 50-50 or trimonite. With the amatol filling, a topping of T.N.T. is used and with the trimonite filling a bakelite fuze-well cup is inserted in the lower portion of the fuze hole.

The shell, excepting the bands, is painted yellow and stencilled in black "81M & 3M ("AM50-50" or "TRIMONITE") SHELL M56". The ammunition lot number and initials of the filler are also stencilled in black near the tail.

5. Fuze P.D. M.53

Details are not yet available.

6. Dimensions of Ammunition.

The overall length of the complete round is 22.9 inches.

The weight of the complete round is 10.62 lb.

The weight of the filled shell is 9.15 lb.

7. Packing.

Each complete round is packed in "Container fibre M37A1." Three of these containers are secured in a bundle packing device.

The M37A1 container is similar to the M.50 (described in Item 495 para.8) but is 24 inches long and has a diameter of 4 inches. The estimated weight of the filled container is 13 lb. The weight when empty is 2.7 lb.

The bundle packing device is similar to that described in Item 495 para.8 but differs in dimensions.

8. Stowage Dimensions.

The stowage dimensions of the bundle packing (3 rounds) are 25.8 x 8.1 x 7.6 inches. The weight is 42 lb. and the volume .91 cubic feet. See remarks regarding stowage space in Item 495 para.8.

499. MORTARS 81-MM. M.1 AND 3-INCH MK.1A2 (AMERICAN). COMPLETE ROUND WITH SHELL, SMOKE, M.57.

1. Components. (Fig.197)

The complete round, (referred to on the Ammunition Data Card, in the package, by the drawing number 75-1-93) consists of the following components:-

- Cartridge, ignition, M.3 (Carrying its own means of ignition).
- Increment, propellant M.2 (4 charges).
- Shell, Smoke, M.57 (Bursting type. Charged white phosphorus).
- Fuze, P.D., M.52.

2. Cartridge, ignition, M.3 (Fig. 195)

The cartridge consists of a 12 bore cartridge head with rolled paper body containing 120 grains of propellant powder. The body is closed at the front end by an arrangement of paper discs and a felt wad. The composition in the cap consists of mercury fulminate, antimony sulphide and potassium chlorate, ground glass may also be included. A circumferential bulge is formed in the paper body, in front of the cartridge head, to retain the cartridge in the propellant container at the tail of the shell. The nomenclature and manufacturers initials are marked in the head and a label at the mouth gives the filler and date of filling.

3. Increment, propellant M.2.

See Item 498 Para.3.

4. Shell, smoke, M.57 (Fig. 197)

This shell is generally similar to the H.E. M.56 described in Item 498 para.4 but is fitted with a longer adapter, at the head, into which is fitted a flanged steel sleeve. This sleeve carries a cylindrical steel casing which extends through the centre of the body for the greater part of its length. The casing is closed at the base end and is approximately 9.9 inches with an internal diameter of .4 inches. The casing contains a M.1 burster charge with a felt disc between it and the base of the casing.

The M.1 burster charge consists of an aluminum alloy tube, 9.83 inches "long" and .39 inches in diameter, containing approximately 292 grains of C.E. in the form of pressed pellets. The tube is closed at the ends by discs of onion skin paper.

The body is charged with approximately 4.06 lb. of white phosphorus. A bakelite fuze-well cup is inserted with glue below the fuze hole in the adapter.

The shell, excepting the bands, is painted blue-grey, has a half inch yellow band below the shoulder and is stencilled in yellow, "WP SMOKE 81M & 3M SHELL M.57". The ammunition lot number and the initials of the filler are also stencilled in yellow near the tail.

5. Packing

Each complete round is packed in "Container fibre M37A1" (See Item 498 para.7). Three containers are secured in a bundle packing device.

The container is sealed by a blue-grey adhesive strip with a central yellow band. The letters "WP", indicating white phosphorus, are included in the nomenclature of the round stencilled on the strip.

6. Stowage Dimensions.

These are the same as those of bundle packing for the H.E. M.56 round given in Item 498 para.8. The weight is 45 lb.

500 FUZE, POINT, DETONATING, M.52.

Fig. 198

1. Details of this American fuze are shown in the Fig.198. The striker is supported by a spiral spring, held under compression between the cup shaped striker and the recess in the head, and is prevented from rising by the lock pin near its pointed end.

The slider carrying the detonator, displaced from the path of the firing pin, is retained in the safe position with its spring under compression by the safety pin. When in the armed position it is retained by its lock pin engaging a recess in a groove in its underside.

The safety pin passes through a fork in the slider, thereby retaining the slider in the safe position, and is retained with its spring under compression by the lock pin engaging in the hole near its inner end.

The lock pin of the safety pin is supported by its spring and the safety wire which fits round the body of the fuze and has one end inserted through coinciding holes in the body and lock pin.

Action.

Before loading the safety wire is removed.

On acceleration, the lock pin of the safety pin sets back and releases the safety pin. Set back of the firing pin during this period would cause the slider to be held by the point of the firing pin engaging the hole in the slider.

The safety pin is ejected by its spring and frees the slider which is moved across the fuze by the slider spring. This movement depresses the slider lock pin which rises and engages the recess in the underside of the slider when the detonator is in the path of the

firing pin. The fuze is then fully armed. On impact the striker with firing pin is driven in and the detonator initiated.

Weight and Dimensions.

The weight of the fuze is .45 lb., the overall length 3.47 inches and the length protruding from the shell is 2.36 inches.

Packing.

The fuze is issued loose in the following 81-mm and 3-inch mortar shells:-

H.E. M33A1, Chem. M.57, Practice M33A1, Practice M.44

501. FUZES. USE OF P.E.T.M./Sax 68/12 FOR MAGAZINE FILLING.

The use of P.E.T.M./Sax 68/12 has been approved as an alternative to S.B. for mine magazines.

502. FUZE WASHERS.

Reference Item 182, Bulletin No.16 and Item 355, Bulletin No. 23.

The stopped shoulder has been re-introduced for fuzes No. 199 Marks VI and VII and No.221 Mk.II.

The use of the copper and asbestos washer, 2.3 inch Mk.I has been extended for the No.208 fuze.

503. FUZE TIME AND PERCUSSION NO.221. MARKING OF FUZES WITHOUT PERCUSSION MECHANISM.

Certain of these fuzes, manufactured before 1st April, 1942, have been accepted with percussion mechanisms removed for use in chemical shells. Fuzes having the percussion mechanism removed have the letter "P" after the fuze number. The letter is also stencilled in blue on the cap and on the cover.

504. GRENADE, HAND, NO.77, W.P., MK.I. DESCRIPTION AND PACKING. Fig. 199

1. The grenade has a timed plate body charged with white phosphorus and is used with the No.247 all-ways fuze over a No.3 Commercial Detonator.

The body is cylindrical except near the base where it is coned. The coned portion has a flat base in which the charging hole is formed. The hole is closed by a soldered lid. The timed plate closing arrangement at the head end of the body includes a socket with a central pocket for the detonator. The socket has a screwthread formed in it to receive the housing for the attachment of the fuze.

The timed plate housing serves as an adapter for the attachment of the fuze to the body and is in the form of a cap with a knurled periphery and a socket. The socket has a central hole and is screwthreaded to engage with the socket in the body.

The fuze is the same as that used in the No.69 grenade and some H.E. shell for the 3-inch S.B. gun. (See Item 505). The threads of the fuze and the housing are cemented before insertion of the fuze so that the fuze is tightly held. A length of adhesive tape is secured to the housing, and the cap

of the fuze. When required for use, the housing, together with the fuze, is removed by unscrewing the housing and the detonator is inserted in the pocket with the open end towards the fuze.

2. Marking.

The whole of the exterior of the grenade is painted green and is stencilled in white as shown in the Fig. 199

3. Dimensions of Grenade.

Overall length (with capped fuze)	4.65 inches.
Overall length without fuze.	3.15 "
Max. diameter.	2.3 "
Approximate weight.	13.5 oz.

4. Packing.

The packing is similar to that for the No.69 grenade (See Item 200, Bulletin No.17) i.e. the steel box No. B.167 which holds 34 grenades. Of the nine containers (No.56) packed in the box, eight contain four grenades each and the ninth contains two grenades and two timed plate cylinders holding the detonators.

5. Stowage Dimensions.

The stowage dimensions of the box are length 21.8 inches, breadth 9.5 inches and depth 9.4 inches. The approximate weight, filled, is 45 lb.

505 FUZE, PERCUSSION NO.247 MK.I. NOMENCLATURE. (Fig.201)

Reference Item 200, Bulletin No.17.

The bakelite all-ways fuze has been allotted the above nomenclature.

This fuze is also used with the No.73 grenade (vide Item 265, Bulletin No.19) and the H.E. shell for the 3-inch S.B. gun (vide Item 264 Bulletin No.19 and Item 342 Bulletin No.22).

506 GRENADE S.I.P. or BOMB A.W. - NOMENCLATURE.

Reference Item 118, Bulletin No.12.

The Self Igniting Phosphorus Grenade (also known as Bomb A.W.) has been designated Grenade, hand No.76 (S.I.P.).

The following items have been published in connection with this grenade:-

Bulletin 12,	Item 118	(Description and packing.)
"	16, "	183 (Storage and effect of temperature).
"	18, "	213 (Superseding Item 183).
"	20, "	286 (Fire risks).
"	22, "	341 (Inspection and proof).

507. CARTRIDGES B.L. 9.2-INCH HOWITZER MARK II. SUITABILITY FOR USE WITH 290 LB AND 315 LB SHELL.

Reference Item 312, Bulletin No. 21 and Item 260, Bulletin No. 19.

1. General.

The 315 lb. streamline shell requires a cartridge shorter in length than those for the 290 lb. shell and is not used with "Charge 6". Although the charge limitation could be overcome by removing section 6 from the cartridges designed for the 290 lb. shell, the length of these cartridges is not thereby decreased and they cannot be loaded into the chamber because of the obstruction presented by the streamlined base of the 315 lb. shell.

2. Cartridges for 290 lb. Shell.

The cartridges for the 290 lb. shell which are unsuitable for the 315 lb. shell because of their length are:-

(it should be noted that these cartridges consist of a core and 5 sections, i.e. charges 1 to 6).

23 lb. 12 oz. 0 dr. M.D.T. or R.D.B.T. 20-10 Mks.I II & III.
24 lb. 1 oz. 6 dr. W.T.206-100 Mk.I.
24 lb. 1 oz. 6 dr. W.M.T.211-100 Mk.I.

3. Cartridges for both 290 lb. shell and 315 lb. shell.

To provide for the interim period whilst both the 290 lb. shell and the 315 lb. shell are in use, cartridges have been produced which are suitable for use with both weights of shell. These cartridges are shorter in length and, like those in para. 2, consist of a core and 5 sections (i.e. charges 1 to 6). Section 6 must not be used with the 315 lb. shell. The cartridges are :-

24 lb. 1 oz. 6 dr. W.T. 206-100 Mk.II
24 lb. 1 oz. 6 dr. W.M.T. 211-100 Mk.II.

4. Cartridges for 315 lb. shell.

When 290 lb. shell are entirely superseded by 315 lb. shell, cartridges designed to provide "Charge 6" will not be required. The following cartridges have therefore, been designed for the 315 lb. only.

(It should be noted that these cartridges consist of a core and 4 section, i.e. Charges 1 to 5).

20 lb. 4 oz. 0 dr. M.D.T. or R.D.B.T. 20-10 Mks.I, II & III
20 lb. 10 oz. 0 dr. S.C.T.198-100 Mk.I
20 lb. 3 oz. 12 dr. W.T.206-100 Mk.II (The Mk.I design has been cancelled).
20 lb. 3 oz. 12 dr. W.M.T.211-100 Mk.II
24 lb. 13 oz. 0 dr. N/S.116-036 Mk.I
24 lb. 0 oz. 0 dr. N.H.033 Mk.I
23 lb. 12 oz. 0 dr. F.N.H.025 Mk.I

These W.T. and W.M.T. cartridges Mk.II differ from those of the same nature and Mark in para. 3 by the omission of Section 6.

5. Super Charges for 315 lb. shell.

The following cartridges are each made up as one charge:-

28 lb. 12 oz. W. 112 Mk. I
28 lb. 12 oz. W.M.118 Mk. I.
36 lb. 14 oz. N/S. 164-048 Mk. I.

508. BOMB, SPIGOT, H.E., A.T., 29-MM. MORTAR MK. I. ALTERNATIVE FILLING.

Reference Item 337, Bulletin No.22.

Approval has been given for Nobels explosive No. 809 as an alternative filling for this bomb.

Nobels No.809 consists of T.N.T., nitroglycerine, nitro-cellulose and kieselguhr.

509. MINES, CONTACT, ANTI TANK. DESCRIPTION OF MKS. V, VC AND IVC. USE OF SORBO RINGS.

Reference Item 84, Bulletin No. 9 and Item 102, Bulletin No.10.

1. Mine Mark V.
Fig. 202

(a) General.

The mine consists of a tinned plate cylindrical body including a tinned plate inner sleeve soldered to the underside of the disc forming the top. A socket to receive the No.3 fuze is also soldered to the top disc and closed by a paper disc secured with shellac. The body is closed at the base by a flanged tinned plate lid which is inserted with an approved cement after filling and carries two steel straps for the support of the operating frame. The straps are secured to the bottom lid at right angles to each other and the four arms thus formed are shaped to fit over the cylindrical wall of the body. A slot is formed near the upper end of each arm to receive a corresponding pin on each arm of the operating frame.

The operating frame is a spider device of mild steel consisting of four arms secured at right angles to a bridge piece at the centre. The arms are fitted with pins and shaped to correspond with the straps carried on the body.

The mark of the assembly contractor and date of assembly are stencilled on the base lid.

(b) Method of Filling (Design No.12744)

The inner sleeve contains approximately 4.5 lb. of T.N.T. (poured or biscuit) which is filled from the base and sealed by a waxed felt disc or woodmeal disc. A second waxed felt disc of a diameter corresponding to the body is inserted after this and followed by a waxed millboard washer.

The monogram of the filling station and date of filling are stencilled near the base.

(c) Weights and Dimensions.

The weight of the mine without fuze is 7 lb. 9 oz. 6 dr.

The internal diameter of the body is 8 inches.

The height of the body is 4 inches.

The maximum overall diameter and height are approximately 9 inches and 5.6 inches respectively.

(d) Packing and Stowage Dimensions.

5 mines with operating frames are packed in the wooden crate M.138 together with a tinned plate cylinder (No.372) which contains 5 tinned plate covers for the fuzes when inserted. The cylinder is located inside one end of the crate by wooden blocks.

The filled crate weighs approximately 43.5 lb. and the empty crate, 5.5 lb.

The stowage dimensions of the octagonal crate are 26 x 10 x 10 inches.

2. Mine Mark V.c. and use of Sorbo rings with Mk.IV covers.

In order to facilitate supply, Mark V mines have been supplied with covers of the type used with the Mk. IV mine (See Fig.14 Bulletin No.9) instead of the operating frame. These are known as Mark V.c mines

Sorbo rings were supplied with these mines, for insertion under the covers when prepared for use, with the object of reducing the liability to initiation by blast effect. As the result of practical tests it has been found that the combination of No. 3 fuze, Mk.IV cover and a sorbo ring in good condition requires a considerably greater load to ensure reliable functioning. No more sorbo rings will be supplied for Mk.IV covers and instructions have been issued to the effect that they will not be used in future; also that the rings will be removed from mines which have been laid for less than 6 months. This does not apply to Mark II mines which can be relied upon to function with the ring assembled.

The weight of the Mk. Vc mine is approximately 9 lb. The mines are packed in the wooden crate M.86 which holds 5 mines with their covers and has the following stowage dimensions, 24 x 10 x 10 inches. The approximate filled and empty weights are 51 lb. and 6 lb. respectively.

3. Mine Mark IVc.

Approval has been given for the conversion of Mark IV mines to the Mark V design by the addition of a tinned plate sleeve thus reducing the filling to approximately the same weight as that in the Mark V.

Mines so converted will be fitted ~~with the operating frame~~ as used with the Mark V and will be identified as the Mark IV.c. The mines and fuze covers will be packed in the same way as the Mark V.

510. MINES, CONTACT, ANTI TANK. MARK V. AMATOL FILLING.

Reference Item 509.

Approval has been given for the filling of Mark V mines with amatol 60/40 or 50/50 in the event of a serious shortage of T.N.T. The average weight of the fillings will be 3 lb. 15 ozs. and 4 lb. 4 ozs. respectively.

The use of amatol for this purpose is liable to lead to corrosion of the tinned plate, particularly under severe conditions of use in wet ground or of storage in a warm and moist climate.

Special protective measures will be introduced to combat this possibility. These measures will consist of two coats of stoved copal varnish on the interior and exterior of the sleeve containing the filling and on the interior of the body. The body of the mine will assist in preventing ingress of moisture to the filling in the sleeve and further protection will be afforded by the use of a T.N.T. topping and the provision of a closing lid, in lieu of the packing disc, for the sleeve.

The serviceability of the thin sleeve is also liable to be affected in tropical storage by the transition of ammonium nitrate at 90°F. Repeated cycles through this temperature may cause the sleeve to burst at its seams. Under these conditions the body of the mine should be advantageous in preserving the serviceability of the laid mine by preventing direct exposure of the filling to moisture.

511. BANGALORE TORPEDO, 2-INCH MARK I. DESCRIPTION AND PACKING.
Fig. 203

1. Description.

The torpedo, 62.5 inches in length and weighing approximately 25 lb. consists of a steel body fitted with an ogival hardwood head and containing a stemmed charge of approximately 7 lbs. of ammonal with a 1 oz. C.E. Mark II field primer at the front end. Two studs are provided near the rear end of the body for the purpose of assembly in series. Recesses are formed in the malleable cast iron coupling at the front end which, without the hardwood ogival head, is fitted over the rear end of another body and engaged by the studs. When assembled in this manner the tinned plate scaling cup at the base end of the leading body fits over the pellet cup, containing the C.E. primer, at the front end of the connected body. An initiating device is assembled at the base end of the torpedo. Details of this device are not yet available.

2. Markings.

The body is painted the usual buff colour with a red ring to indicate the H.E. filling and is marked with a one inch pink band denoting ammonal. The following details are stencilled in black:- "BANG. TORP 2" I" followed by, the monogram of filling firm or station, lot number and date of filling.

3. Packing.

Four torpedoes, without the hardwood heads, are packed in "Clamp, packing, bangalore torpedo". The clamp is also used for the packing of four steel packing tubes containing twentyfour heads (i.e. six in each tube).

The clamp consists of two steel end plates each of which are provided with rope handles and four circular recesses to receive the torpedoes or packing tubes. The end plates are secured by a steel bolt with winged nuts.

4. Stowage Dimensions.

The stowage dimensions of the assembled package are 61.5 x 7 x 7 inches. The weight when packed with torpedoes is estimated to be approximately 130 lb. or when packed with tubes containing heads, about 110 lb.

512. PRIMER, PERCUSSION Q.F. CARTRIDGE NO. 28 MODIFIED FILLING.

Reference Item 389, Bulletin No. 24.

A filling consisting of 72 grains of gunpowder G.7 in the magazine separated by a paper disc from 3 grains of G.12 in the body has been approved.

513. PRIMERS, PERCUSSION, Q.F. CARTRIDGE. WATERPROOFING.

Reference Item 309, Bulletin No. 21.

The use of Brunswick black in lieu of R.D.1160 has been approved for making a waterproof joint between the cap and the primer body.

The use of a disc of bakelised paper set in R.D.1177 (black) over the closing discs of the following primers No. 1 Mark II, No.5, No.16 and No.27 has been approved.

R.D.1177 has the following composition:-

Resin	24%	} The black composition consists of 90 parts 1177 and 10 parts lamp black.
Tung Oil	24%	
Decalin	4%	
Dipentene	2%	
Xylol	46%	

514. CONCESSIONS TO FACILITATE OUTPUT AND SUPPLY.

Reference Item 121, Bulletin No.12 and Item 360, Bulletin No. 23.

Tinned plate cylinders and boxes for tubes, primers, detonators etc. will be issued unpainted and all tube boxes will be tape banded.

515. CARTRIDGE Q.F. 75 MM., F.N.H.016. USE OF PRIMER PERCUSSION 49 GRAIN MARK I.

Reference Item 137, Bulletin No.13 and Item 389 Bulletin No.24.

The American "Primer percussion 49 grain" (short primer) is approved as an alternative to the No.28 for cartridges filled F.N.H.016.

516. CARTRIDGES S.A. 20 MM. OERLIKON GUN.
Figs. 200 and 204.

1. Anti-aircraft ammunition of Naval design for the 20 mm. Oerlikon gun is being supplied to the Land Service. Details of all existing types are not available yet but details of the H.E. Mark I.Z. H.E. Mark II.T.Z. and Tracer Projectile Mark I.T.Z. rounds are shown on the Figs.

2. The tracer compositions light up at the muzzle and provide a reddish trace which is visible by day. The duration of the trace is at least 3.8 seconds with the H.E. tracer shell and at least 4 seconds with the tracer projectile.

3. Packing and Stowage Dimensions.

306 rounds, each in a Container No. 30, are packed in Box A.S.A. H.33 Mark I and II.

Container No. 30 is a rolled paper cylinder 7.4 inches in length and 1.1 inches in diameter.

Box A, S, A, H.33 is a wooden box with a metal lining. The lid of the box is secured by screws and the metal lining has a tear-off soldered lid. The stowage dimensions of the box are 21.2 x 19.7 x 13.9 inches. The empty and filled weights are 37 lb. and 212 lb. respectively.

517. CARTRIDGE Q.F. 75.MM. GUN. TABLE OF AMERICAL COMPLETE ROUNDS.

References:- Item 137, Bulletin 13, Item 250 Bulletin No.19, Item 391 Bulletin No.24 and Item 416 Bulletin No.25.

1. The table (Page 20) and the following details have been compiled from American tables revised to 9.10.41 and such design drawings as are available.

2. Models or Marks of Guns.

The following are field guns:-

Mod. '97 (Mark I)
" '16 ("S" Mark III)
" '17 (Converted Mark I).

The following are tank guns:-

M.2 ("S" Mark III)
M.3
T.7. This is an earlier designation of the M.2 type. Some guns designated T.7 were issued prior to standardization to M.2.

3. Nature of Projectile.

(a) H.E. Shell.

The standard bursting charge is T.N.T. but Mark I shell may be filled Amatol or Tridite.

(b) Chemical Shell.

The Mark II shell of round 75-1-8 is a smoke shell charged white phosphorus or titanium tetrachloride.

The Mark II shell of round 75-1-95 is a smoke shell charged chloro-sulphonic acid.

The Mark II shell of round 75-1-96 has a chemical charging of the blister gas type.

(c) A.P. Shot and S.A.P. Shot.

The Shot A.P. M.61 and Shot S.A.P. M.72 include a tracer.

4. Adapter and Booster or Burst.

Some Mark II chemical shell of round 7-1-8 are fitted with adapter and booster Mark IV.B.

The target practice projectile, which is sand filled and fitted with a burnt out 21 second combination fuze '07M, is fitted with a Mark III adapter without booster.

5. Fuzes.

The following fuzes may also be used in the H.E. Shell Mark I of the 75-1-52 rounds:-

Fuzes P.D. Mark III, IV, V and M.35.

Fuze P.D., T18E2, which is similar to the P.D.M.48 fuze but designed for simplified production, may be issued in lieu of the M.48 if necessary.

6. Propelling charges.

The tabulated weights are approximate for F.N.H. Powder. Where the weight is given as "1.25 to 1.44 lb." the variation is due to various granulations of F.N.H. Powder which have been used in existing ammunition. N.C.T. may also be used.

7. Primers.

The primers tabulated are the standard primers but some rounds have been fitted with the 49 grain percussion primer or the 100 grain percussion primer, M.1.

The following 100 grain primers may also be used:-

M.1, M.1.A.1., M.1.B.1., M.I.B.1.A.1. or M.2.2.A.1.

The Primer, percussion, 49 grains is also used with N.C.T. as a substitute standard.

Table of Complete Rounds of American Ammunition for Q.F. 75-mm. Guns.

Complete Round No.	Mark of model of gun in which fired.	Projectile.			Adapter & Booster or Burst	Fuze	Propelling Charge.	Primers (Standard).
		Nature	Mark	Wt. fuzed				
75-1-52	M'97, M'17, M'16	H.E.	Mk. I	12.44 lb.	Mark III	P.D.M.46	1.25 to 1.44 lb.	75 gr. M22A2
75-1-52	"	H.E.	Mk. I	12.41	"	P.D.M.47	"	"
75-1-52	"	H.E.	Mk. I	12.41	"	P.D.M.47	.56 lb.	"
75-1-52	"	H.E.	Mk. I	12.44	"	P.D.M.46	"	"
75-1-78	"	H.E.	M.48	14.6	M.20	P.D.M.48	2 lb.	150 gr. M.31
75-1-79	M'97, M'17, M'16, M.2, M.3, T.7	H.E.	M.48	14.6	"	P.D.M.48	1.13 lb.	75 gr. M22A2
75-1-80	"	H.E.	M.48	14.6	"	P.D.M.48	.56 lb.	"
75-1-84	"	H.E.	M.48	14.6	"	T.Sq.M.54	2 lb.	150 gr. M.31
75-1-85	"	H.E.	M.48	14.6	"	T.Sq.M.54	1.13 lb.	75 gr. M.22A2
75-1-86	"	H.E.	M.48	14.6	"	T.Sq.M.54	.56 lb.	"
75-1-8	"	Chem.	Mk. II	12.77	Mark IVM1	P.D.M.46	1.25 to 1.44 lb.	"
75-1-95	"	Chem.	Mk. II	12.88	"	P.D.M.46	"	"
75-1-96	"	Chem.	Mk. II	12.31	"	P.D.M.46	"	"
75-1-6	"	Shrap.	Mk. I	15.95	"	21 second Comb. 107M	1.69 lb.	100 gr. MIRA2
75-1-105	M'97, M'17, M'16, M2, M3, T7	A.P. Shot	M.61	14.4	-	-	2 lb.	150 gr. M.31
75-1-127	"	S.A.P. Shot	M.72	13.94	-	-	1.9 lb.	"
75-1-20	M'97, M'17, M'16	T.P.	Mk. I	11.85	Mark III	P.D.Mk. IV*	1.35 lb.	75 gr. M22A2

518. ROCKETS "U" 3-INCH. LOW TEMPERATURE LIMITATION TO USE OF TAILS PROPELLING.

Reference Item 346, Bulletin No.22 and Item 438, Bulletin No.26.

1. Arrangements have been made for the withdrawal of tails propelling which are subject to the low temperature limitation of 32°F. (See Item 346). The filled tail lots involved are Lots 1 to 24 inclusive.

2. Tails fitted after the adoption of composition S.R.371.C. (in lieu of S.R.354) continued to be stencilled 32°F. until it was established that these could be relied upon to function at temperatures down to 0°F. These tails are not subject to the 32° limitation and the stencilling indicating this limit will be disregarded with filled tail lot No.25 and subsequent lots.

3. The lotting of filled tails is a Naval system and the lot number, prefixed by the letter "B", is stencilled near the forward end of these tails of Naval origin.

519. PRIMERS, PERCUSSION, Q.F. CARTRIDGE NOS. 12 AND 18. CAP FILLINGS.

Reference Item 258, Bulletin No.19.

To ensure functioning with the firing mechanism of the Q.F. 40-mm. gun it has been found necessary to revert to the use of A.1 mixture for the filling of the caps of the No.18 primer and the Mark IV No.12 primer.

The use of the No.12 Mark II primer is restricted to exclude 40-mm ammunition as the caps in primers of this mark are filled Q.F. cap composition.

520

A M E N D M E N T S

- | | |
|-----------------|--|
| Bulletin No. 9. | Item 84, page 2, para. headed " <u>Packing</u> ", line 3, delete "25" and substitute "24". |
| Bulletin No.12. | Item 117, page 3, line 2 delete "30" and substitute "4 lb.". |
| Bulletin No.13. | Item 137, line 11 delete "47" and substitute "49". |
| Bulletin No.25. | Item 430, page 8, Line 12 delete "2.264 inches" and substitute "2.235 inches". |
| Bulletin No.27 | Fig.179, centre drawing (Amatol fillings) delete "80/80" and substitute "80/20". |

ENEMY AMMUNITION.

GERMAN H.E. (EGG SHAPED) HAND GRENADE. (Fig. 205)

1. The grenade has a grey body of thin gauge steel which contains a bursting charge of amatol and a time initiating system which is operated by pulling the ball cap, with cord attached, before throwing.
2. The body is made in two parts spun together and is closed at the head by a flange on the steel bush which receives the igniter and carries the steel pocket for the detonator. The bush is screwthreaded to engage the igniter assembly and is spun to the flange of the pocket.
3. The igniter consists of steel body with a square iron nut near the head to facilitate insertion in the grenade. Three screwthreaded portions are formed on the body to engage the ball head, the bush and the detonator respectively. The body contains the two ends of a protruding looped wire embedded in match composition. A length of twine is threaded through the wire loop and secured to a loose washer inside the ball head where the twine is stowed when the head is screwed to the igniter. The detonator is packed separately and a transit cap of moulded composition is fitted to the igniter when packed.
4. The detonator has a plated steel body and is screwthreaded internally at the open end for assembly to the igniter.

Action

The detonator is assembled with the igniter and inserted in the grenade when prepared for use.

To operate the igniter before throwing, the ball head is unscrewed and pulled to draw the ends of the looped wire through the match composition thus initiating the composition.

522. GERMAN H.E. (STICK TYPE) HAND GRENADE.
Fig. 206

1. The grenade has a cylindrical body of thin gauge steel containing a bursting charge of T.M.T. and fitted with a wooden handle which contains a time initiating system. The system is operated by pulling a porcelain ring attached to a cord at the end of the handle.
2. The steel body contains a bursting charge of T.M.T. in a paper container and is closed by a steel closing disc fitted with a detonator pocket. A steel adapter with an internal screwthreaded to receive the handle is fitted over the closing disc.
3. The beech handle is hollowed to accommodate the igniter assembly and is fitted with a steel igniter holder at one end. The igniter holder is screwthreaded internally to receive the brass bush on the igniter. The holder is also the means of attaching the handle to the body and for this purpose is provided with an external screwthread to engage the adapter fitted to the body. A steel sleeve is fitted over the holder to cover the junction between the adapter and holder. The outer end of the handle is fitted with zinc sleeve in which a screwthread is formed to receive a zinc closing cap. A retainer consisting of steel and millboard washers attached to a spring by a rivet is carried under the cap.

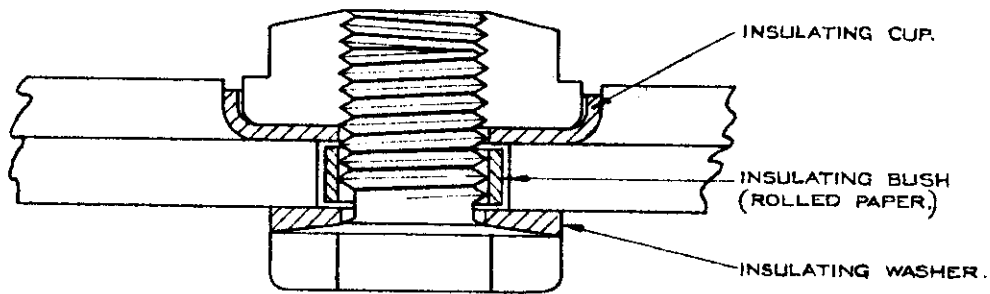
4. The igniter consists of a lead tube containing match composition in which the two ends of a protruding loop wire are embedded. A brass bush is fitted at one end of the tube with a left handed screwthread for assembly in the igniter holder. The detonator is a push fit in this bush. The ends of a length of twine, threaded through a porcelain ring, are lead through the protruding wire loop and retained by a wooden bead. The twine passes through the handle to an enlarged space at the outer end where the twine and porcelain ring are stowed under the retainer and screwed cap.

5. The handle, with igniter assembly fitted, is packed separately. The detonator is also packed separately. These components are assembled and inserted when required for use.

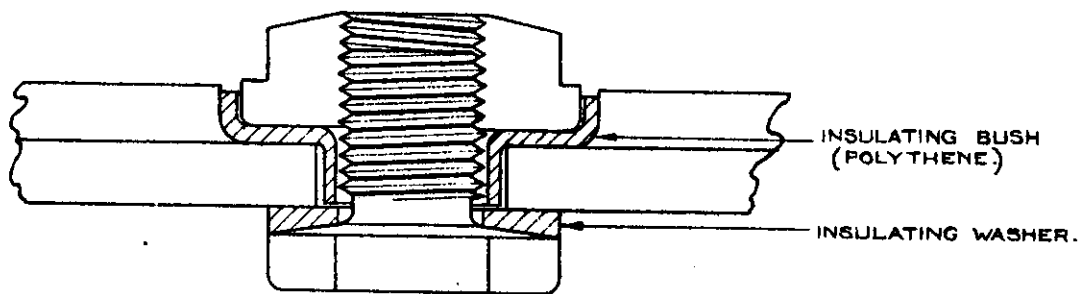
6. Before throwing, the screwed cap is removed from the handle and the porcelain ring pulled to draw the ends of the wire loop through the match composition and causing the igniter to function.

FIG. 187

3-INCH TAIL PROPELLING CONTACT ASSEMBLIES.



CONTACTS ASSEMBLED WITH
PRESSPAHN CUP AND ROLLED
PAPER BUSH.



CONTACTS ASSEMBLED WITH
POLYTHENE BUSH.

FIG. 188

3-INCH TAIL PROPELLING BAKELITE CLOSING DISC.

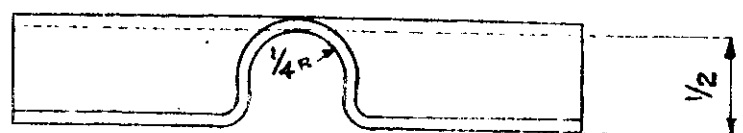
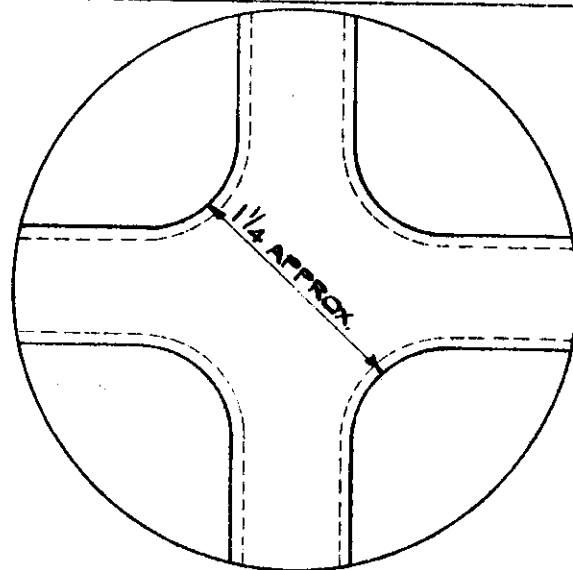


FIG. 189.

SHELL H.E. M.49.A.2 FOR 60 M.M. MORTAR M.1. & M.2.

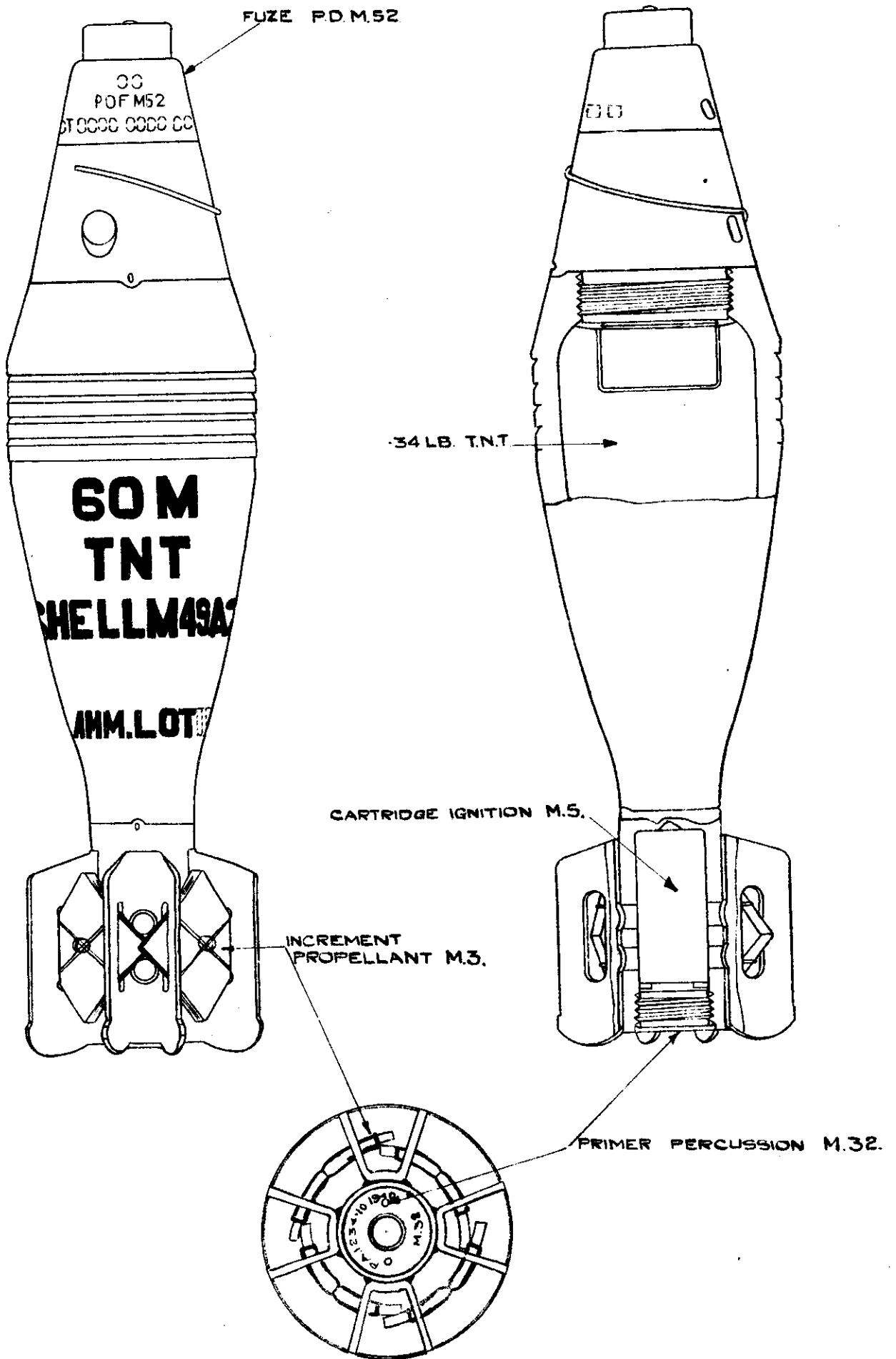
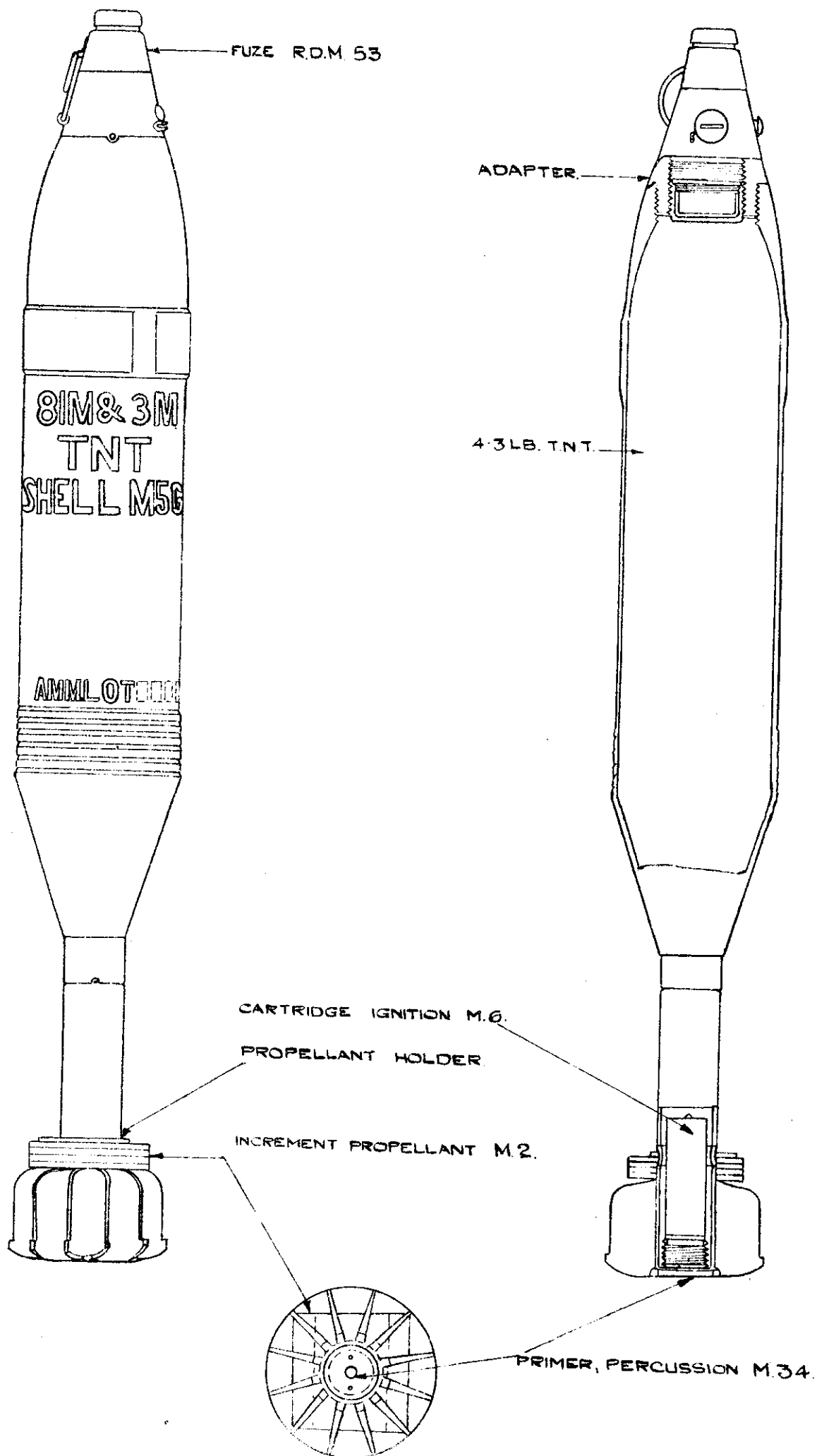
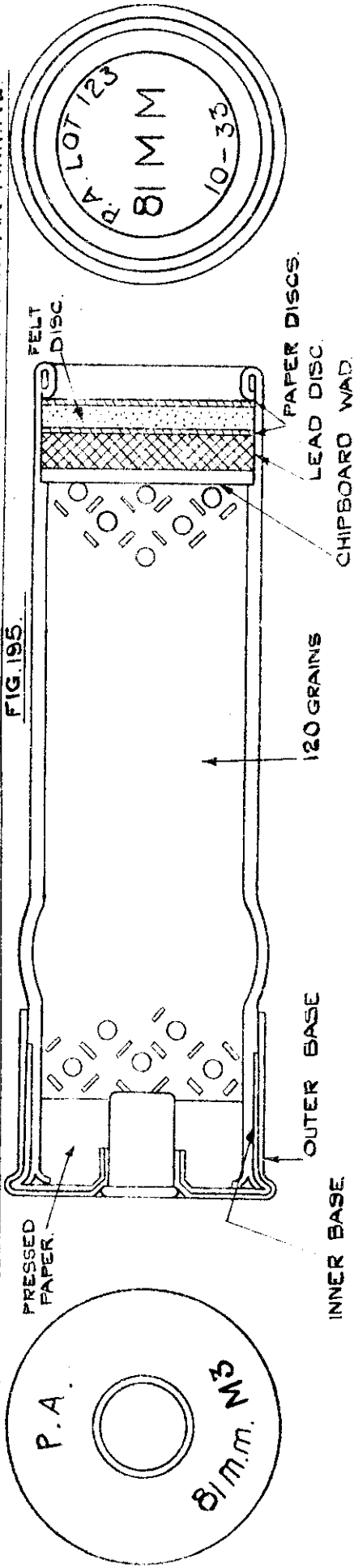


FIG. 194.

SHELL HE M56 FOR 81-M.M. MORTAR M.1. AND 3 INCH MORTAR MK.1A2.

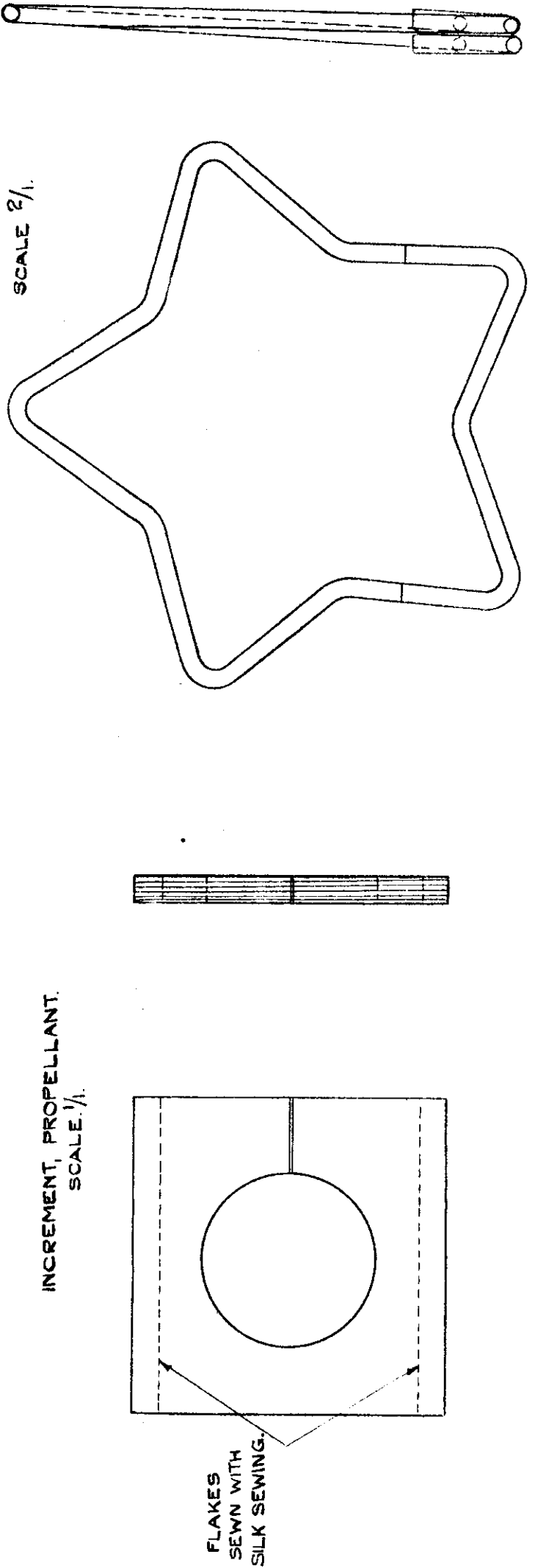


CARTRIDGE IGNITION, M3 FOR SHELL, SMOKE, M57, 81-MM MORTAR M1 & 3-INCH MORTAR MK.1A2.



INCREMENT, PROPELLANT, M2 & HOLDER FOR 81-MM SHELL, H.E., M56 & SMOKE M57.

FIG. 196



INCREMENT, PROPELLANT.
SCALE: 1/1.

HOLDER PROPELLANT.
SCALE: 2/1.

FIG. 197

SHELL SMOKE W.P. M.57 FOR 81-MM MORTAR M.1 & 3-INCH MORTAR MK. 1A2.

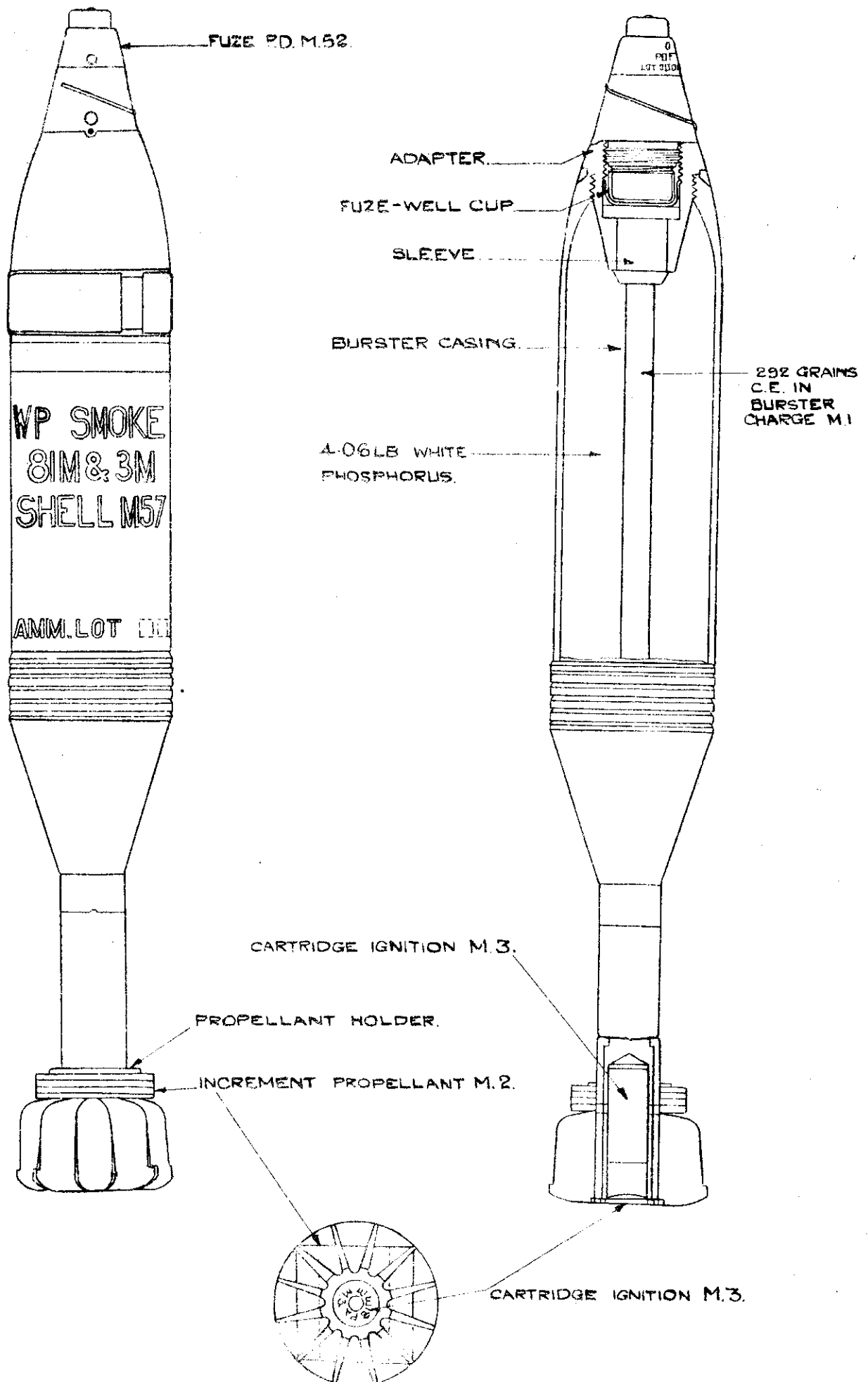


FIG. 200
CARTRIDGE, S.A. 20 M.M. OERLIKON GUN—TYPICAL.

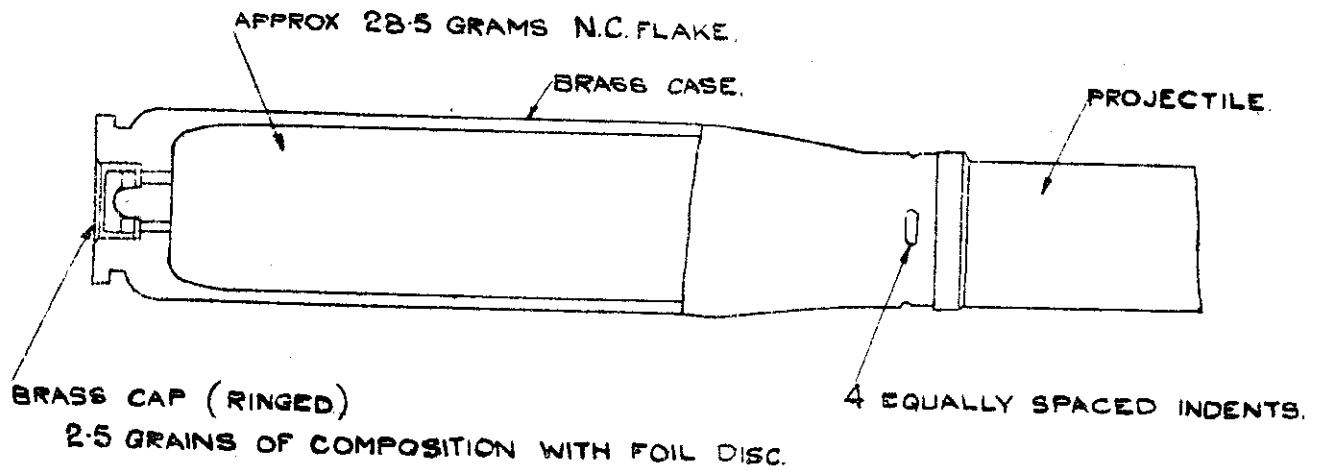
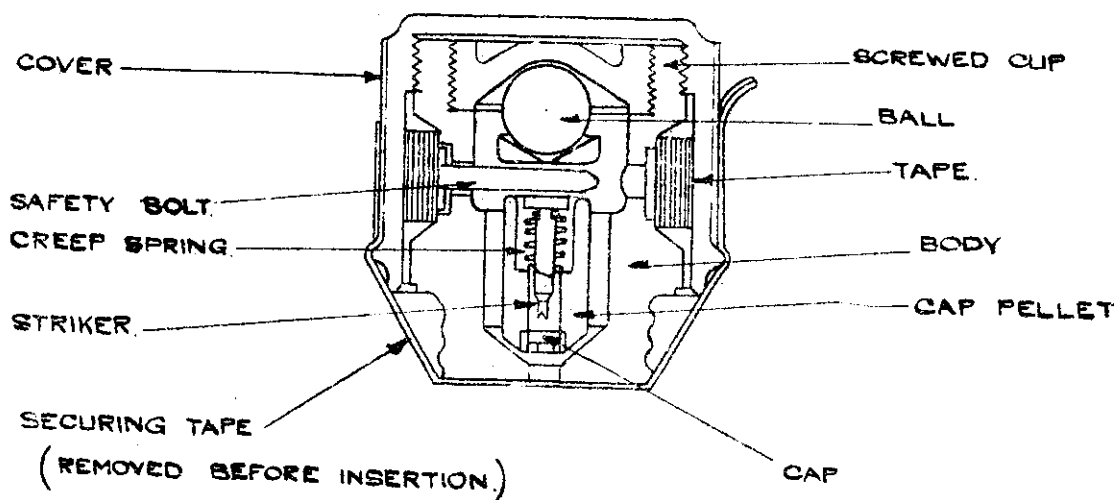


FIG. 201.
FUZE PERCUSSION N° 247.



FUZE LABEL FOR 3" S.B. AMN.



SHELL LABEL FOR 3" S.B. AMN.

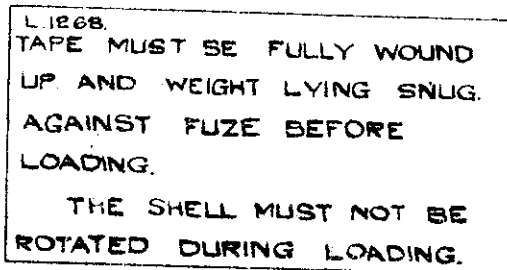
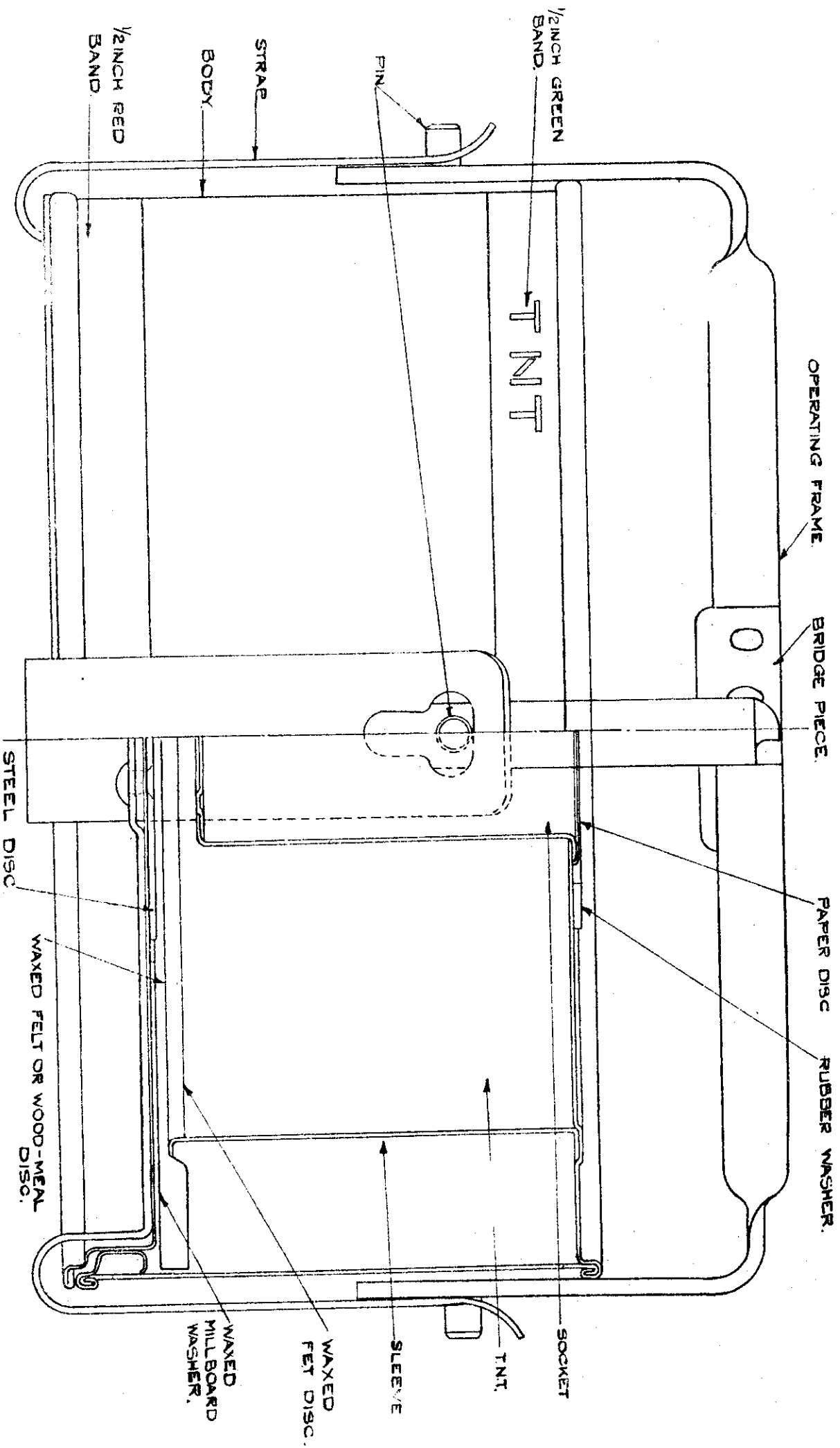


FIG 202.

MINE, CONTACT ANTI-TANK MK IV



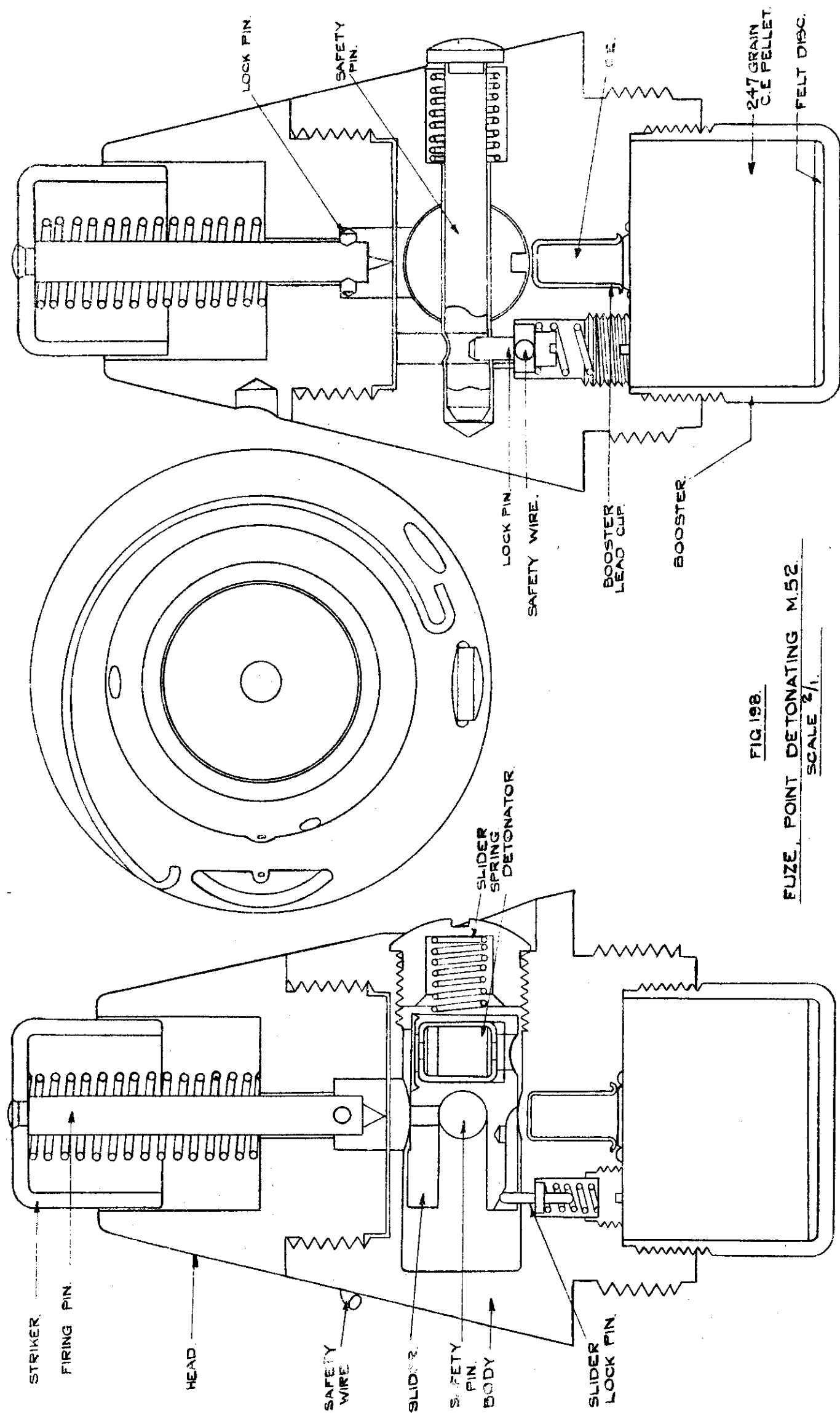
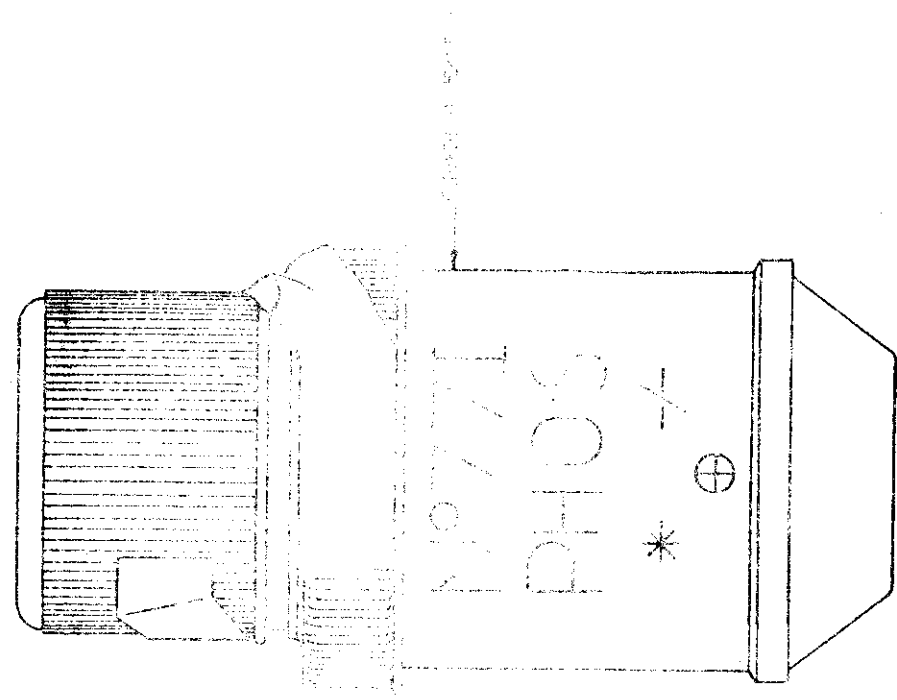
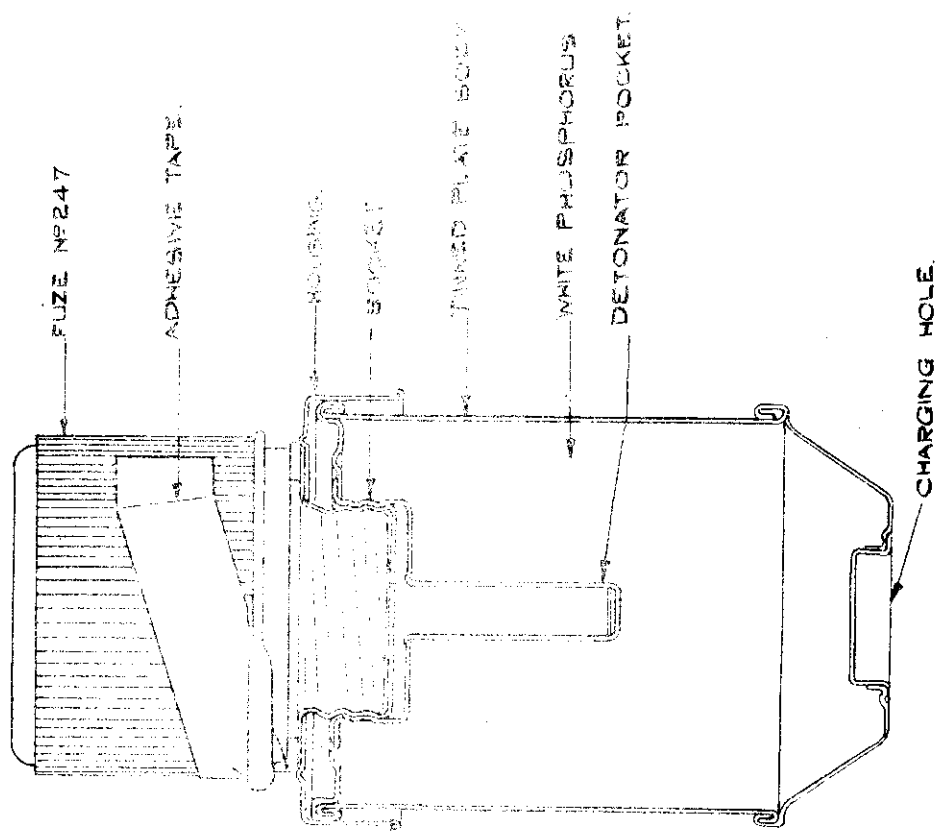


FIG 198.

FUZE, POINT DETONATING M.52

SCALE 2/1

FIG. 199.
GRENADÉ HAND N° 77 W.F. MK.1.



HE MK.I.

FIG 204.
20 mm OERLIKON AMMUNITION SCALE 2/1.
HE MK.II T.

PROJ. TRACER MK.I.T.

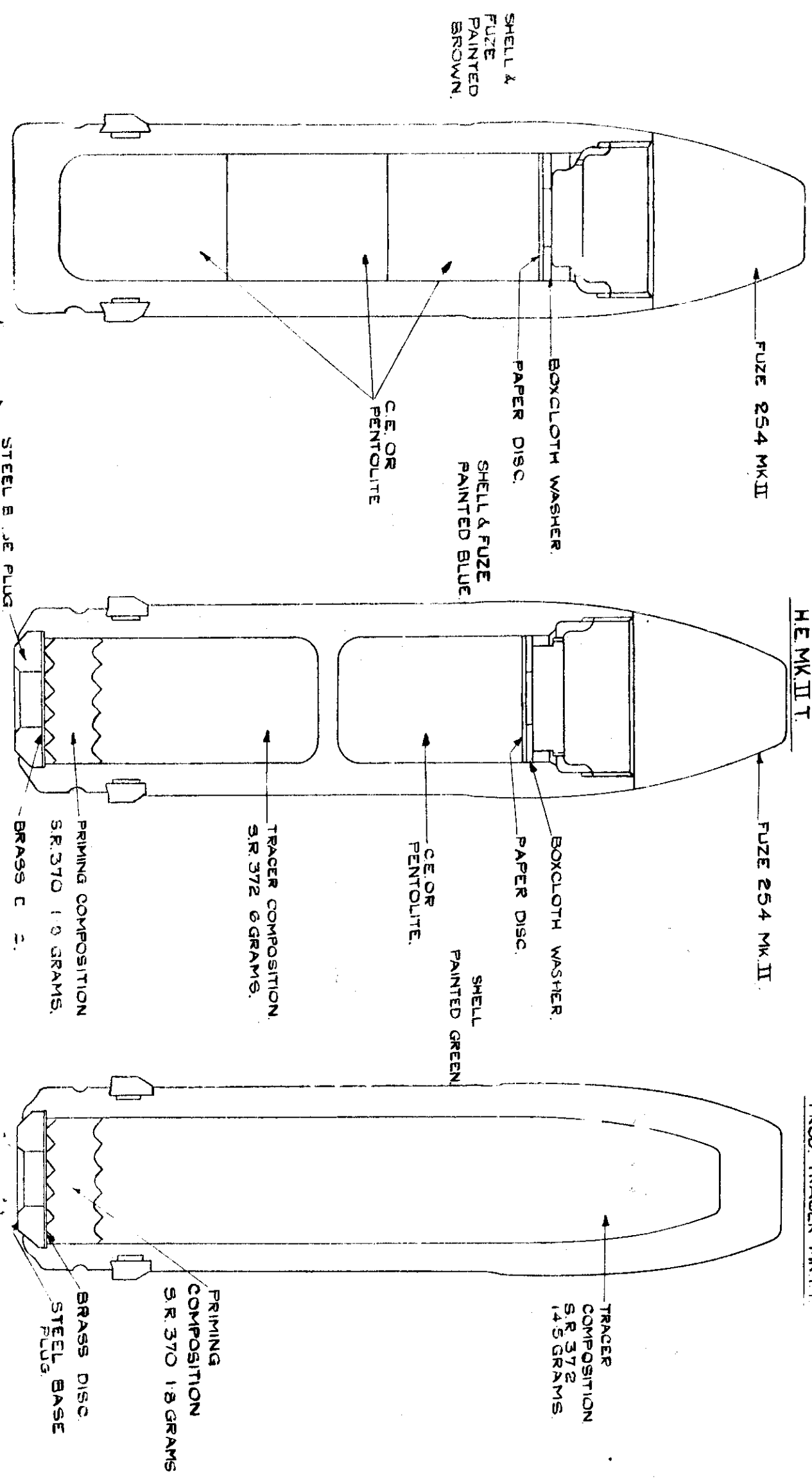


FIG. 203
BANGALORE TORPEDO 2-INCH MK 1

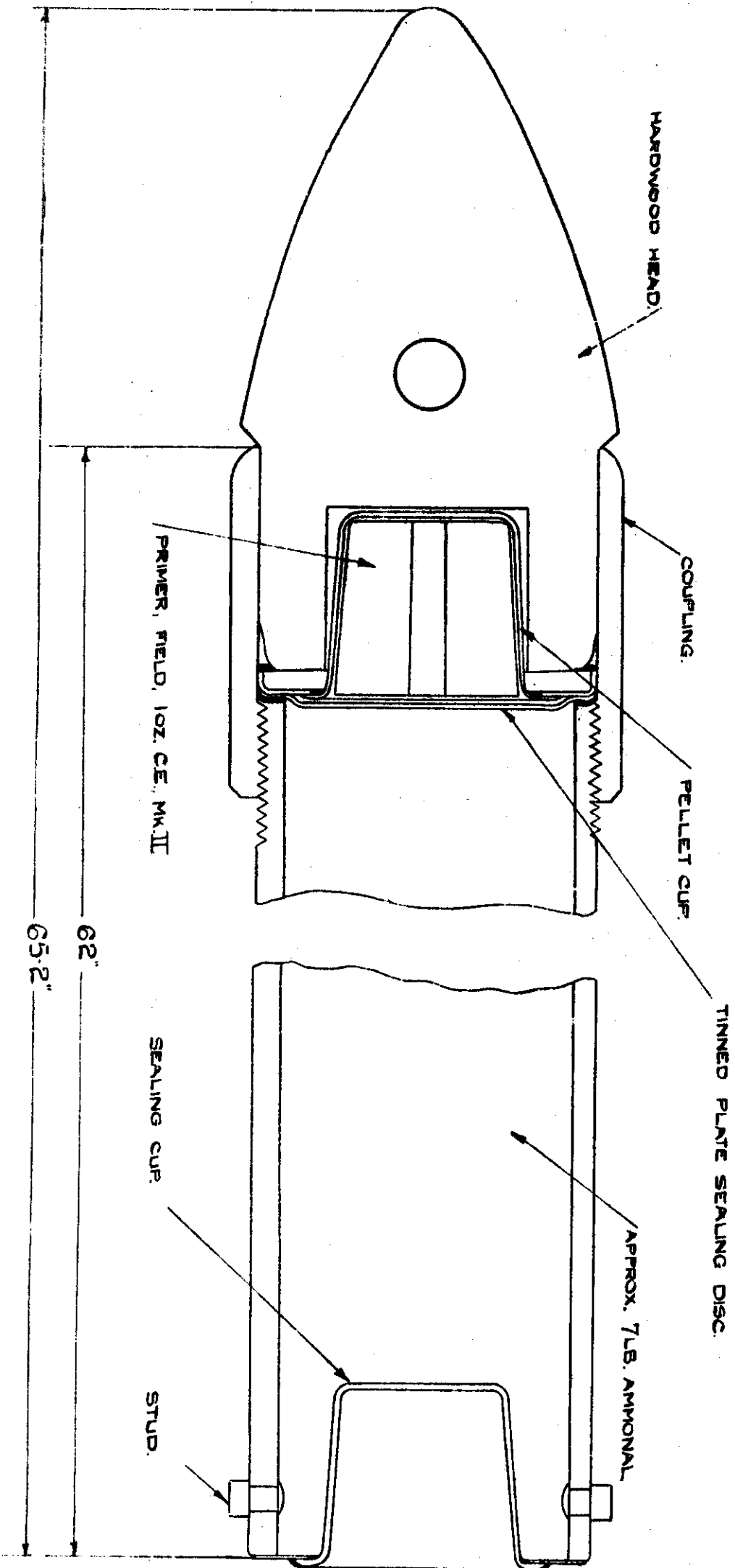


FIG. 205
GERMAN H.E. (EGG SHAPED) HAND GRENADE.

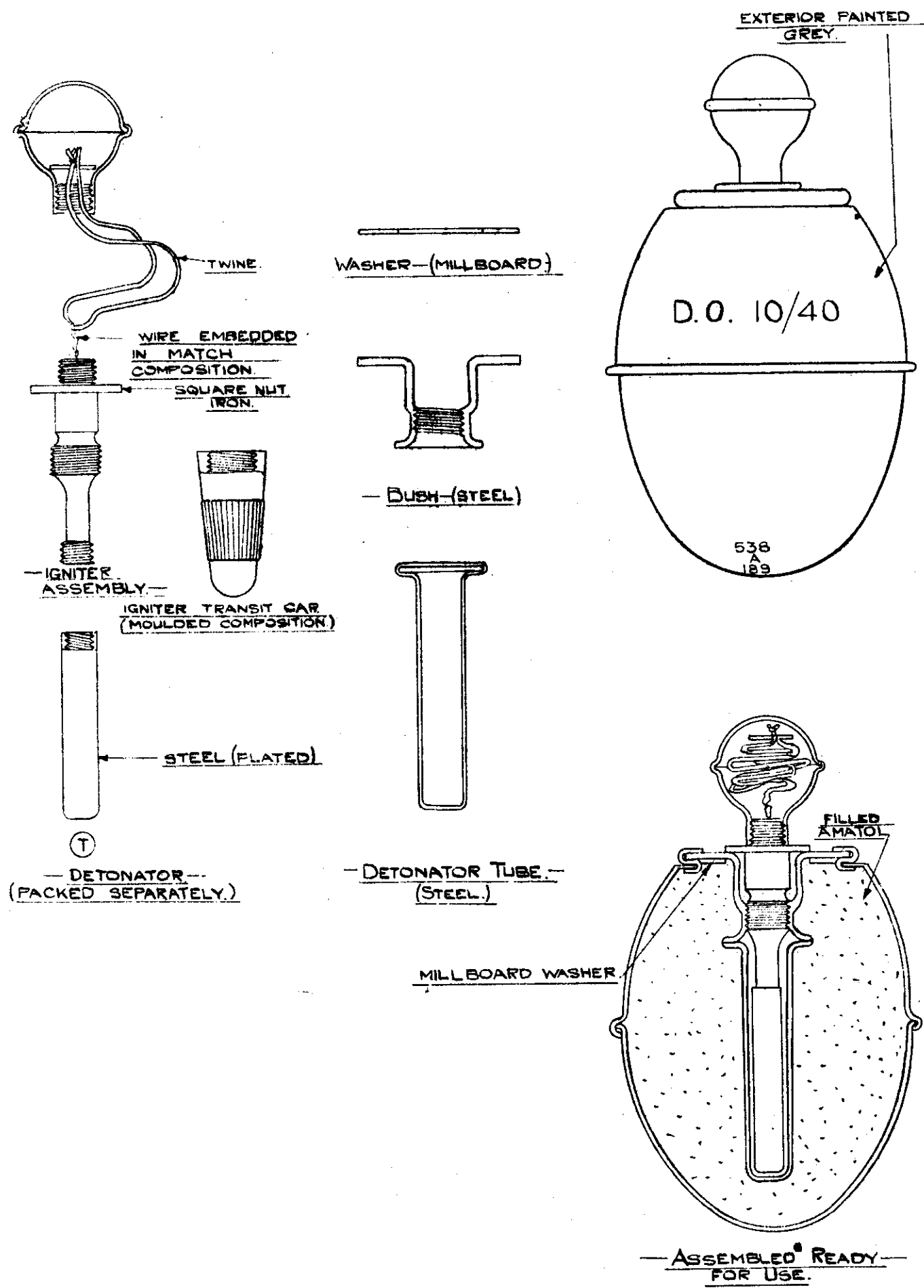


FIG. 206.
GERMAN HE (STICK TYPE) HAND GRENADE.

